SRAP
Smallholder Rubber Agroforestry Project
ICRAF/GAPKINDO/SRAP

WEST-SUMATRA PROGRESS REPORT

NUMBER 2/Augustus 1996

R.A.S ON FARM EXPERIMENTATION
IMPLEMENTATION IN THE WEST-SUMATRA PROVINCE
In East Pasaman

MONITORING MISSION

Eric Penot, ICRAF
Pak Hisar, BPS

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TABLE OF CONTENT

1 OBJECTIVE OF THE MISSION

The main objective was to monitor the implementation of the 8 on-farm trials in the village of Bangkok, East Pasaman. A programme of activities has been set up with the staff involved in the activities, ie Pak Coan, PPL from DISBUN, who will work 2 days a week on SRAP activities, Pak Sofyan, Pro-RLK, as field coordinator, Pak Hisar, BPS for technical support and Hellen Kramer, Pro-Rlk, as supervisor.

2 TRIALS CHARACTERISTICS

All 8 trials are located in the village of Bangkok, representatyive of a very critical land pattern with the following characteristics :

- The altitude is at the limit of marginal land for rubber (between 500 and 600 meters).
- soils are acid leached soils with a very low nutrients content,
- steep slopes with high risk of erosion,
- sheet Imperata environment.

RAS 2.2 systems with continuous foodcrops pattern and countour lines appear as one of the most probable tree crop based alternative to rehabilitate such critical land.

The 3 trials implemented in Bangkok are the following :

RAS 2.2a : *comparison of 3 amounts of fertilization for rubber* :

- PLOT A : "0 fertilization",

- PLOT B : " application of high amount of Rock Phosphate (RP) at planting time only (1 ton /ha or RP, 27.5 % in the planting hole and 72.5 % broadcast in the field at planting time)

So - in theplanting hole : 500 grams per trees (275 kg/ha)
- broadcast in the field at planting time : 725 kg/ha

- PLOT C : complete TCSDP fertilization programme for the first 2 years with RP at planting time and NPK fertilisation every 3 months).

TCSDP fertilization programme is the following:

IN GRAMMES/tree

	PLANTING TIME October 96	+ 3 months January 97	+ 6 months April	+ 9 months July	+ 12 months October
RP	200				
UREA		50	50	50	50
SP36		40	40	40	40
KCL			40	40	40

The amount of each fertilizer to be supplied to the plots is calculated in anex for each farmer and for each plot.

Note that the protocol of this trial has been changed compared to the original version released in the March 1996 report, to take into account the interesting results of the PKT demo plots (use of 1 ton of RP/ha).

RAS 2.2b : *emphasis is put on rice experimentation : varieties x fertilization.*

- PLOT A : local rice or improved rice (variety 1) + 0 fertilization

- PLOT B : local rice or improved rice (variety 1) + CRIFC fertilization dose (high dose recommended by CRIFC/Bogor)

- PLOT C : improved rice (variety 2 + 0 fertilization

- PLOT D : improved rice (variety 2) + CRIFC fertilization dose (high dose recommended by CRIFC/Bogor)

Rice varieties 1 and 2 are Wayararem and Jatiluhur with a 4 months cycle.
Local rice varieties have a 6 month cycle.

"CRIFC fertilization dose" is the dose recommended by CRIFC/Bogor for JAMBI.
FERTILIZATION DOSE

DOSE IN KG/HA	UREA	SP 36	KCL
CRIFC	150	220	150

Note that the protocol of this trial has been changed compared to the original version released in the March 1996 report.

In 1996, due to the fact that some farmers have already planted their fields with local rice, the programme is the following :

farmers	PLOT A	PLOT B	PLOT C	PLOT D
SIAM	LOCAL RICE			
BURHAM	LOCAL RICE			
BADUL	Jatiluhur	Jatiluhur	Wayararem	Wayararem
MUKTAR	local No fertilization	local no fertilization	Wayararem	Wayararem
BURHAM extra plot	Jatiluhur	Jatiluhur		

Siam and Burham : no rice experiment in 1996. Loca lrice with no fertilization.
Badul : complete design with 4 plots : Jatiluhur/Wayararem x dose 0/dose CRIFC
Muktar : design of the fields according to the map as some plot have been partially planted with local rice (no fertilization) and 2 plots will be planted with Wayararem (1 plot with 0 fertilization and 1 plot with CRIFC fertilization).

To complete the rice experiment, a small plot without rubber (pak Burham) will be planted with 2 plots : be planted with Jatiluhur (1 plot with 0 fertilization and 1 plot with CRIFC fertilization).

RAS 2.2c : ***emphasis is put on the comparison between clones (both RRIC 100 and PB 260) , BLIG (BLIG from North-Sumatra, and Seedlings from South-Sumatra (originally sold as BLIG but supplied to DRAP by a South Sumatra project).***

The 3 plots are :
- PLOT A : clone
- PLOT B : BLIG
- PLOT C : Seedlings from South Sumatra.

The relative hologeneity and absence of characteristic yellow leaves plants of BLIG in the planting material supplied by a project in South-Sumatra indicates the possibility that this planting material is not BLIG but another clonal seedling planting material.

Normaly, these plots are planted with improved rice varieties with BPS fertilization (BPS is a moderate dose of fertilization).
' BPS fertilization dose" is the dose recommended by BPS/Sembawa (used in RAS 2.2c)

FERTILIZATION DOSE for RAS 2/2c

DOSE IN KG/HA	UREA	SP 36	KCL
BPS	100	160	75

In 1996; farmers have planted their fields with local rice so this protocol for rice is cancelled and postmoned for 1997..

In 1996 : local rice and NO fertilization

All new RAS trials protocols are presented in anex 1.
Plot situation is presented in anex 2.

3 VISIT TO THE SRAP SITE IN EAST PASAMAN : in the village of BANGKOK.

The mortality of rubber has been very high (up to 80 %in the RAS 2.2a fields) due to late planting, direct planting of stumps and relative drought of the dry season. The late and direct planting has not allow the rubber trees to have a sufficient development of roots to compete with drought.
Therefore, the conclusion for rubber are the following according to this very critical environment :

- early planting in october of stumps in polybags with the minimum stage of 1 whorl is required . Stumps have therefore to be prepared in polybags in July for a planting in the fields in october. The sooner the best in order to allow a sufficient development of the young trees to survive a possible drought in dry season, according to erractic rainfall pattern.

- fertilization seems to be a key component for the first year, either with a high amount of RP at planting time of with a 3 months continuous supply such as TCSDP fertilization programme. The trial RAS 2.2a should provide an answer.

- Imperata is not anymore a problem as long as continuous cropping is done by the farmer : the consequence is that weeding of rubber trees is perfect. However, continuous cropping without supply of fertilizers may lead probably to a limited nutrient supply for rubber. fertilization of intercrops shouls be seriously considered.

- rotation of rice and leguminous(peanut in that case) is favorable to both rubber growth and rice production

4 MAIN COMPONENT OF A PROGRAMME OF ACTIVITIES

4.1PROGRAMME OF ACTIVITIES FOR THE PPL/DISBUN

Time table : 2 days per week.

Programme of activities per month

AUGUSTUS

Maps of each fields will be provided to the PPL by ICRAF. Fields maps have the complete design of the fields with all rubber and associated trees.
These fields maps are the following :
- fields maps with locations for associated trees (Durian, Petai, Jengkol, Kemiri and Cinnamon)
- fields maps with the definition of the plots according to the type of trials :
    - RAS 2.2a/rubber fertilization : 3 plots with fertilization dose : 0, RP at planting time and TCSDP (RP at planting time and SP36/UREA/KCL every 3 months)
    - RAS 2.2b /Rice fertilization : 4 plots : 2 varieties x 2 dose of fertilization (0 and CRIFC).
    - RAS 2.2c/ Comparison clone/BLIG : 3 plots with clone, BLIG and seedlings from SumSel.
- fields maps with the selection of rubber trees to be measured for growth monitoring in each plots.

PPL and other staff should use these fields maps in order to implement the fields and monitor the farmers activities on rice and rubber planting, planting of associated trees and rice and rubber fertilization.

ACTIVITIES

- field stacking (pancan ajir) for clonal rubber for the 2 following farmers : Pak Badul and Pak Moktar (plots where rubber has to be planted in October 96).

- field stacking for non clonal rubber for the 2 following farmers for the "Bidji Sumsel" plots : Pak Budiman and Pak Udin (plots to be planted in October 96).

- field stacking for rice experiment : pak Burham (extra field close to the ICRAF field), pak Badul, pak Muktar.

The field stacking is according to fields maps provided to PPL.

- monitoring of the dead plants in each field : an empty map is copied and each dead tree should be marked as "dead". For all 6 planted fields. A table may report the total number of trees, the dead trees and the trees alive such as following :

Name of the farmer :
Type of trial:
Plot name :

PLOTS	total number of trees	DEAD TREES	TREES ALIVE
A			
B			
etc.....			

- ordering of fertilizers and other inputs necessary for the campaign (sprayer, round-up....), according to the field mission progress report of August 1996.

SEPTEMBER

- field staking for associated trees, according to the map provided by ICRAF. All 8 fields. All tree locations will be labeled with the name of the tree to be planted, so each farmers knows where to plant the trees. The associated trees are randomized on the field.

- control of the holing for rubber (6 x 3 m according to contour) and associated trees (9 x 12 m according to contour). All holes for rubber have to be completed by farmers at the end of September. All holes for associated trees should be completed for October.

- checking of stumps in polybags in farmers locations : with a good irrigation and control of growth (control that the shout is coming from the grafted bud and not from the rootstock) and ensure that there is enough stumps for planting, or replacements of dead trees; in case there is not enough stumps in polybag (related to the number of dead trees per fields) : immediately report to Pak Hisar for ordering more stumps from Sembawa.

- checking of the associated trees nurseries in farmers locations.
Each farmers should prepare :
- 20 durians
- 20 petai
- 20 jengkol
- 20 kemiri
- 50 cinnamon.
- implementation of a stock security nursery for associated trees in Rao in PPL's place.
With the following :
- 200 durians
- 200 petai
- 200 jengkol
- 200 kemiri
- 200 cinnamon.

- rubber growth monitoring for 2 farmers fields : Pak Siam and pak Burham, according to the protocol (measurements of 30 trees per plot with diameter, number of payung and height). So the number of trees to be measured , according to the fields maps is the following :

  - RAS 2.2a/rubber fertilization : 3 plots with fertilization dose x 30 trees = 90 trees per field
  - RAS 2.2b /Rice fertilization : 4 plots x 30 trees = 120 trees per field
  - RAS 2.2c/ Comparison clone/BLIG : 3 plots x 30 trees = 90 trees per trees.

Data are collected on the "rubber growth monitoring file" available in the RAS plot files with 1 page per plot.

.- distribution of fertilizers and rice seeds to the farmers : fertilizers for rubber (planting time) and for rice (planting time and later for urea), according to tables available in the Augustus Field Report.

- making of the signs and implementation in the fields : Big sign of trials presentation at the entrance of the fields, signs per farmers close to each fields and signs per plots.

OCTOBER

- planting of rubber and fertilization at planting time :
  - specific fertilization for RAS 2.2a (Ema and Warni)
  - same fertilization for all the others : 200 grams of RP per tree at planting time

- planting of improved rice and fertilization at planting time (1/3 dose urea + SP 36 and KCL : see the protocol for the dose /ha and the tables in the report for each dose calculated per plot for each farmer.

- planting of associated trees : between October and December according to the tree status in polybags.

NOVEMBER

- distribution of UREA for rice experiment and monitoring of urea broadcast in the field (1 month after planting : 1/3 dose urea).

- monitor the planting of associated trees

- checking of the rice : chemical treatment if necessary in case of attacks of insects and pests.

DECEMBER

- distribution of UREA for rice experiment and monitoring of urea broadcast in the field (2 month after planting : 1/3 dose urea)

- monitor the planting of associated trees

- monitoring of rice harvesting (local rice) and control of rice production per plot (measuring the weight : production of the plot) and sending a sample of 100 grams of rice to ICRAF/Bogor.

- RAS 2.2a/rubber fertilization : 3 plots with fertilization dose : so measurement of rice production for each.

- RAS 2.2b /Rice fertilization : 4 plots : so measurement of rice production for each.

- RAS 2.2c/ Comparison clone/BLIG : 3 plots : so measurement of rice production for each.

- monitoring of dead plants in the fields (same as in September for all 8 fields.

- checking of the rice : chemical treatment if necessary.

Monitoring of labour

Each farmers should have a copy of the "buku buruh" and report in thisbook everytime he's going to SRAP plot the following :
- activity
- number of persons
- number of hours
- type of buruh : keluarga (familial) or Lain (external)
- the plot concernec (bagian).

The PPL should once a month that information is well collected by farmers. It is important for the farmers to be concerned wxith data collecting.

A monthly report of activities and problems will be sent every month to Pro-RLK and to BPS.
A technical mission with BPS (Pak Hisar), PRO-RLK/GTZ (Hellen Kramer) and ICRAF (E Penot) is scheduled in December. A further programme of activities will be then drafted.

INPUTS AND ACTIVITIES DISTRIBUTION BETWEEN FARMERS AND SRAP

SRAP project : INPUTS AND ACTIVITIES	FARMER : INPUTS AND ACTIVITIES
Rubber stumps for : Planting : Pak muktar and pak Badul replacements : all other farmers	Planting and replacement
fertilizers for rubber	application according to TRIAL protocoles
wayararem AND Jatiluhur seeds (improved upland rice)	local rice seeds
fertilizers for rice	seeds of palawijas for dry season cropping
Insecticides ad pesticides for rice A special sprayer is supplied for that particular activity	Chemical treaments in the fields
Flemingia for contour line	Implementation of contour line
Buku Buruh + bolpen	Record of activities in the ICRAF fields
tools (cangkol)	
Protection system against wild pigs (4 per farmers)	Control of animals
Round-up for new farmers for plot preparation for planting BLIG	Spraying in the fields
BLIG and seedlings from SUMSEL planting material	Plot preparation and planting
polybag for rubber and associated trees	Nurseries for rubber and associated trees
Plants of Sao for associated trees	collecting 20 seeds of Durian, 20 seeds of jengkol, 20 seeds of kemiri, 20 seeds of petai and 50 cinnamon for associated trees

PROGRAMME OF TECHNICAL SUPPORT MISSIONS FROM BPS

Technical support mission from PBS (pak Hisar) are scheduled for Mid September, mid October and December.

The main activities will be the folowing :

MID- SEPTEMBER

- Control of the activities to be implemented according to the programme of activities
- preparation of the rice experimentation
- control of the plot stacking for rubber, for the associated trees and for the plot division of each field.

- ***collection of soils samples by plot and by trials.***
Two samples are collected per location : one for the 0-15 cm and one for the 15-30 cm. A sample is made with a minimum of 10 samples per plot and mixed together.

The soils samples to be collected is the following :

TRIALS	number of plots per trial	number of trials	total number of soils samples per location to be collected
RAS 2.2 a	**6**	**2**	**12**
RAS 2.2 b	**4**	**4**	**8 (pak Badul + pak Muktar) + 2 (others) = 10**
RAS 2.2 c	**3**	**2**	**6**
TOTAL			**28 locations**

Note : Only the 4 plots of pak Badul and Pak Muktar are sampled. The other RAS 2.2 b are all planted with the same local rice : in 1996 : there is no 4 plots in term of rice experiment. So for the 2 other farmers (Pak Siam and pak Burham) : only 1 sample per field.

TOTAL SOIL SAMPLES : 28 locations x 2 samples per location (0-15 and 15-30) : 56 soil samples.

All soil samples should be processed in Septembe and a report, with soil sample analysis and comments should be sent to E Penot in october 1996.

MID- OCTOBER

- Control of the activities to be implemented according to the programme of activities
- control of the rice experimentation
- control of the rubber planting
- control of the associated trees planting
- control of rubber fertilization according to the protocol
- control of rice fertilization according to the protocol
- control of the signs in the plots according to field maps
- information to farmers about the different treatments in the plots

DECEMBER

This mission will be a joint mission with PBS (pak Hisar), ICRAF (E Penot) and Pro-RLK (H Kramer and Pak Sofyan).

OTHER MONITORING ACTIVITIES to be implemented by Pak Sofyan

Paddy species survey :

Pak Sofyan may supervise a short survey on the local upland rice varieties used by the farmers/ It will help us to select the best local variety, ie the best adapted to local conditions and appreciated by farmers, to be used in our trials. Survey file is in anex 3.

RAS Plot files

Each field should have its plo-file with all relevant information (data, groth monitoring, maps.....). Plot-files are available in the first SRAP report of march 1996 and have been translated.

Monitoring of labour

Each farmers should have a copy of the "buku buruh" and report in thisbook everytime he's going to SRAP plot the following :
The PPL should once a month that information is well collected by farmers. ***Pak Sofyan should sheck that labour monitoring is correctly done.***

Technical training

Pak Hisar should train technically on rubber, rice and soil conservation the PPL and all staff from Pro-RLK/Disbun involved in our on farmexperimentation in the fields.

Order of inputs.

See in anex the inputs rerquirements and the date of supply.

ANEX 1

RAS 2.2 PROTOCOLES

RAS 2.2a TRIAL PROTOCOL

RUBBER + associated trees + intercropping

RUBBER FERTILIZATION

West-Sumatra province
East Pasaman

RAS METHODOLOGY

RAS 2.2a TRIAL PROTOCOL
RUBBER + associated trees + intercropping
RUBBER FERTILIZATION

TITLE
Clonal rubber in agroforestry environment : rubber + selected associated trees + intercropping / TREATMENT ON RUBBER FERTILIZATION

OBJECTIVE/HYPOTHESE
OBJECTIVES

As in jungle rubber system where rubber seedlings are associated with various kind of trees and plants, RAS 2.2 aims to associate usefull trees (fruits and timber trees) with rubber, at a limited planting density, without subtantial decrease in rubber yield.
Rubber is planted at normal planting density of 550/ha as associated trees are planted at 92 trees/ha with a maximum number of 30 for big trees.
In that case, fertilization of rubber may be a key factor in the trade-off between fertilization and level of weeding. In thecase of East Pasaman area where fields are continously cropped, weeding is not anymore a key factor as rubber tres are well weeded. The critical situation of the land : slope with high risk of erosion , poor soils , erractic rainfall and local severe drought during dry season as well as altitude implies that rubber should grow very fast during early stage after planting.
This trial is aimed to compare 3 level of fertilization on clonal rubber in RAS 2.2 system.

Hypotheses :

General hypotheses for RAS 2.2 :
- It is expected that rubber growth during immature period will not be affected by associated trees competition as these selected fruits and timber trees have generaly a slow growth pattern (in partticular for durian , local fruits and timber species).
- It is expected that intercropping during the first 3 or 4 years of rubber imature period will create a favourable environment for a good rubber growth due to intercrop weedings and secondary effect of fertilization..
- Intercropping will limit the extend of weeds such as Imperata.

Specifically for RAS 2.2A in West-Sumatra :
- We do not know in the specific conditions of West-Sumatra if rubber need fertilization or not, and a which level.

RAS 2.2a protocol

EXPECTED OUTPUTS

To produce recommendations on components of RAS 2.2 :
- rubber fertilization management required for successful growth of rubber clone in this environment

LOCATION : WEST SUMATRA , East Pasaman, village of Bankok

YEAR :
planting of rubber :
first planting : January 1996
Replanting : october 1996

DURATION
5 to 6 years for immature period. The first 2 years are critical in terms of growth and survivability. Then, if possible, a minimum of 3 years of production monitoring.

MATERIALS AND METHOD
Rubber + intercropping + associated trees : **on all plots.**

Treatments : on rubber fertilization

- PLOT A : "0 fertilization",

- PLOT B : " application of high amount of Rock Phosphate (RP) at planting time only (1 ton /ha or RP, 27.5 % in the planting hole and 72.5 % broadcast in the field at planting time)
So - in theplanting hole : 500 grams per trees (275 kg/ha)
- broadcast in the field at planting time : 725 kg/ha

- PLOT C : complete TCSDP fertilization programme for the first 2 years with RP at planting time and NPK fertilisation every 3 months).

TCSDP fertilization programme is the following:

IN GRAMMES/tree

	PLANTING TIME October 96	+ 3 months January 97	+ 6 months April	+ 9 months July	+ 12 months October
RP	200				
UREA		50	50	50	50
SP36		40	40	40	40
KCL			40	40	40

The amount of each fertilizer to be supplied to the plots is calculated in anex for each farmer and for each plot.

EXPERIMENTAL DESIGN
Randomized block system
2 replications per farm.
2 farms
Total number of replication : 4 rep.

RUBBER
All rep are planted with RRIC 100.

FERTILIZATION

PLOT A : O fertilisation.
PLOT B : RP only at planting time
PLOT C : TCSDP fertilization programme only for the first 2 years. No fertilization later.

RUBBER PLANTING DISTANCE
Standart : 550 trees/ha : 3 x 6 meters.

RUBBER WEEDING :

6 weedings ayear , every 2 months, on a regular basis. Local observation and presence of alang² may change that pattern.

RAS 2.2a protocol

INTERCROPPING

RAINY SEASON
Rice is not a treament is this trial. The same variety with the same amount for fertilization is cropped in all the field.
Local rice has been planted in 1995/96 without fertilization.
Local rice has been planted in 1996/97 without fertilization.
FOR 1997 :
Rice will be planted in september 1997 : improved rice + recommended BPS/Sembawa fertilisation (100 kg urea + 130 kg SP 36 + 75 kg KCL). Urea is provided in 3 periods : planting time, + 40 days and + 80 days after planting.
Chemical treatment againts pests and diseases.
Weeding : 2 weedings during growth.

DRY SEASON
According to farmers strategy: nothing or palawijas : such as groundnut which is the best inter crop for dry season.
No fertilization.

ASSOCIATED TREES

Planting density : 92 trees/ha : 9 x 12 meters.
Selected trees are durian, Petai, Jengkol, Kemiri and Cinnamon + other trees acccording to local situation. The associated trees frame should be the same for all trials, or similar.
Weeding : same as for rubber (6 weedings/year).

FIELD SIZE per farm

PLOT SIZE : 1000 m²
NUMBER OF PLOTS PER REPLICATION : 3 plots
NUMBER OF REPLICATION/farm : 2
NUMBER of FAMS : 2
REPLICATION/FARM SIZE : 6 plots : 6 000 m²

TOTAL SIZE OF THE TRIAL : 1.2 ha with 2 farmers
Total number of replication : 4

DATA TO BE COLLECTED

Standart data for all RAS 2.2 :

RAS 2.2a protocol

RUBBER

- rubber growth measurements : diameter, height and worls the first year every 3 months. Then girth the second year every 3 months. Sample of 30 trees per plot (according to field maps).
- Farmer's labour for each plot.
- soil samples per replication on 0-15 and 15-30 cm.

Total number of soil samples for the 2 farms : 6 plots x 2 rep x 2 soil depths = 24

ASSOCIATED TREES

- tree growth measurements : girth every year at planting anniversary time for all trees per plot.

RICE

- date of planting
- date of harvest
- yield of each plot with a sample of 100 grams to be sent to ICRAF/Bogor for water content measurement.

Labour requirement per plot, recorded by farmers and controled by PPL.

RAS 2.2b TRIAL PROTOCOL

RUBBER + associated trees + intercropping

RICE EXPERIMENTATION : VARIETY X FERTILIZATION

West-Sumatra
East Pasaman

RAS METHODOLOGY

RAS 2.2b TRIAL PROTOCOL
RUBBER + associated trees + intercropping
RICE EXPERIMENTATION : VARIETY X FERTILIZATION

TITLE
Clonal rubber in agroforestry environment : rubber + selected associated trees + intercropping / TREATMENT ON RICE VARIETIES AND AMOUNT OF FERTILIZATION.

OBJECTIVE/HYPOTHESE
OBJECTIVES

As in jungle rubber system where rubber seedlings are associated with various kind of trees and plants, RAS 2.2 aims to associate usefull trees (fruits and timber trees) with rubber, at a limited planting density, without subtantial decrease in rubber yield.
Rubber is planted at normal planting density of 550/ha as associated trees are planted at 92 trees/ha with a maximum number of 30 for big trees.
Rice intercropping provides to rubber a indirect good weeding management and good conditions for growth. The objective is to optimize in farmers conditions rice cropping with the best adapated technological package adoptable by local farmers

Hypotheses

General hypothese for RAS 2.2 :
- It is expected that rubber growth during immature period will not be affected by associated trees competition as these selected fruits and timber trees have generaly a slow growth pattern (in partticular for durian , local fruits and timber species).
- It is expected that intercropping during the first 3 or 4 years of rubber imature period will create a favourable environment for a good rubber growth due to intercrop weedings and secondary effect of fertilization..
- Intercropping will limit the extend of weeds such as Imperata.
- there is an indirect benefit of rice fertilization on rubber.

Specific for RAS 2.2 b :
- We do not know in the specific conditions of West-Sumatra what are the best adapted rice varieties and their management (weedings and fertilization) as well as the best adapted crop rotation.

EXPECTED OUTPUTS

To produce recommendations on components of RAS 2.2 :
- Rice varieties, fertilization level and rotation (with palawijas).

LOCATION : WEST SUMATRA , East Pasaman, village of Bankok

YEAR :
planting of rubber :
-January 1996
- Replanting : October 96

DURATION
5 to 6 years for immature period. The first 2 years are critical in terms of growth and survivability. Then, if possible, a minimum of 3 years of production monitoring.

MATERIALS AND METHOD
Rubber + intercropping + associated trees on all plots.

DRAFT
Treatments : A (rice varieties) x B (fertilization level):

Treatment A
- local rice or improved rice : + 0 fertilisation.

Treament B
- Local rice or improved rice + recommended CRIFC fertilization programme.

Treatment C
- Improved rice (wayararem/Jatiluhur) + 0 fertilization

Treatment D
- Improved rice (Wayararem/Jatiluhur) + recommended CRIFC fertilization programme.

Urea is provided in 3 periods : planting time, + 40 days and + 80 days after planting.
Chemical treatment againts pests and diseases.
Weeding : 2 weedings during growth.

"CRIFC fertilization dose" is the dose recommended by CRIFC/Bogor for JAMBI.
FERTILIZATION DOSE

DOSE IN KG/HA	UREA	SP 36	KCL
CRIFC	150	220	150

EXPERIMENTAL DESIGN
Split plot with main treatment : variety and sub treatment : fertilization

1 replication per farm. 4 plots per farm
4 farms
Total number of replication : 4 rep.

All rep are planted with PB 260

RUBBER

FERTILIZATION of RUBBER

TCSDP fertilization programme only for the first 2 years. No fertilization later.

TCSDP fertilization programme is the following:

IN GRAMMES/tree

	PLANTING TIME October 96	+ 3 months January 97	+ 6 months April	+ 9 months July	+ 12 months October
RP	200				
UREA		50	50	50	50
SP36		40	40	40	40
KCL			40	40	40

The amount of each fertilizer to be supplied to the plots is calculated in anex for each farmer and for each plot.

RUBBER PLANTING DISTANCE

Standart : 550 trees/ha : 3 x 6 meters.

RUBBER WEEDING :

6 weedings ayear , every 2 months, on a regular basis. Local observation and presence of alang² may change that pattern.

INTERCROPPING

RAINY SEASON

See treatments ON RICE

DRY SEASON

According to farmers strategy: nothing or palawijas : such as groundnut which is the best inter crop for dry season.

ASSOCIATED TREES

Planting density : 92 trees/ha : 9 x 12 meters.

Selected trees are durian, Petai, Jengkol, Kemiri and Cinnamon + other trees acccording to local

situation. The associated trees frame should be the same for all trials, or similar.
Weeding : same as for rubber (6 weedings/year).

FIELD SIZE per farm
PLOT SIZE : 1000 m²
NUMBER OF PLOTS PER REPLICATION : 4 plots
NUMBER OF REPLICATION/farm : 1
REPLICATION/FARM SIZE : 4 plots : 4 000 m²
Number of farms : 4
TOTAL SIZE OF THE TRIAL : 1.6 ha with 4 farmers
Total number of replication : 4

DATA TO BE COLLECTED

Standart data for all RAS 2.2 :
RUBBER
- rubber growth measurements : diameter, height and worls the first year every 3 months. Then girth the second year every 3 months. Sample of 30 trees per plot.
- Farmer's labour for each plot.
- soil samples per replication on 0-15 and 15-30 cm.

Total number of soil samples for the 2 farms : 4 plots x 2 rep x 2 soil depths = 16 (Badul and Muktar)
2 fields x 2 soild depth = 4 (siam and Burham)
Total = 20

ASSOCIATED TREES
- tree growth measurements : girth every year at planting anniversary time for all trees per plot.

RICE
- date of planting
- date of harvest
- yield of each plot with a rice sample of 100 grams to be sent to Bogor to control the water content

Labour requirement per plot.

RAS 2.2c TRIAL PROTOCOL

RUBBER + associated trees + intercropping

COMPARISON CLONAL RUBBER AND POLYCLONAL SEEDLINGS (BLIG)

RAS METHODOLOGY

RAS 2.2c TRIAL PROTOCOL
RUBBER + associated trees + intercropping
COMPARISON CLONAL RUBBER AND POLYCLONAL SEEDLINGS (BLIG)

TITLE
Clonal rubber in agroforestry environment : rubber + selected associated trees + intercropping / Comparison between rubber planting material : Clone vs bLIG

OBJECTIVE/HYPOTHESE
OBJECTIVES

As in jungle rubber system where rubber seedlings are associated with various kind of trees and plants, RAS 2.2 aims to associate usefull trees (fruits and timber trees) with rubber, at a limited planting density, without subtantial decrease in rubber yield.
Rubber is planted at normal planting density of 550/ha as associated trees are planted at 92 trees/ha with a maximum number of 30 for big trees.
Various type of rubber planting material are available in particular clones and BLIG (polyclonal seedlings from North and South-Sumatra) : the aim is to do a comparison between rubber planting material : rubber clone vs bLIG (polyclonal seedlings from LONDON SUMATRA, North Sumatra). BLIG is a polyclonal seedlings from the Bah Lias Isolated Garden.

Hypotheses

- Clonal rubber requires more weeding and maintainance that polyclonal seedlings.
- Use of polyclonal rubber seeds is less expensive that clones and easier to use (direct planting).
- The selected clones are resistant to leaf diseases as BLIG seems to be very susceptible (as it has been observed in West-Pasaman).
- Clones productivity is higher that that of polyclonal seedlings.
- Polyclonal seedlings are very heterogeneous (30 % of the trees produce 70 % of the total production) leading to more labour and caution for tapping.
- growth of polyclonal seedlings is supposed to be more vigourous that that of clones, however this may be not true with fast growing early starter clones such as those selected for RAS (PB 260 and RRIC 100)

General hypothese on RAS 2.2
- It is expected that rubber growth during immature period will not be affected by associated trees competition as these selected fruits and timber trees have generaly a slow growth pattern (in partticular for durian , local fruits and timber species).
- It is expected that intercropping during the first 3 or 4 years of rubber imature period will create a favourable environment for a good rubber growth due to intercrop weedings and secondary effect of fertilization..
- Intercropping will limit the extend of weeds such as Imperata.

EXPECTED OUTPUTS

To produce recommendations on components of RAS 2.2 :
- rubber planting material suitability between BLIG and clones for East Pasaman conditions..

LOCATION : WEST SUMATRA , East pasaman, village of Bankok

YEAR :
planting of rubber :
CLONE and BLIG:
-January 1996
- replanting : october 1996
Seedlings from SUMSEL :
- October 1996
These seedlings have been sold by a South-Sumatra project as BLIG planting material but does not seem to be the same type as BLIG.

DURATION
5 to 6 years for immature period. The first 2 years are critical in terms of growth and survivability. Then, if possible, a minimum of 3 years of production monitoring.

MATERIALS AND METHOD
Rubber + intercropping + associated trees on all plots.

Treatments
PLOT A. Control:
Clonal Rubber PB 260 (1 rep in one farm, pak Udin) and RRIC 100 (1 rep in one farm : Pak Budiman)

PLOT B. BLIG from North-Sumatra

PLOT C. Seedlings from South-Sumatra

EXPERIMENTAL DESIGN
Randomized block system
1 replications per farm
2 farms :

RUBBER

FERTILIZATION

TCSDP fertilization programme only for the first 2 years. No fertilization later.

TCSDP fertilization programme is the following:

IN GRAMMES/tree

	PLANTING TIME October 96	+ 3 months January 97	+ 6 months April	+ 9 months July	+ 12 months October
RP	200				
UREA		50	50	50	50
SP36		40	40	40	40
KCL			40	40	40

RUBBER PLANTING DISTANCE
Standart : 550 trees/ha : 3 x 6 meters.

RUBBER WEEDING :

6 weedings ayear , every 2 months, on a regular basis. Loca observation and presence of alang² may change that pattern.

INTERCROPPING

RAINY SEASON
Rice is no a treament is this trial. The same variety at the same amount for fertilization is cropped in all the field.
Local rice has been planted in 1995/96 without fertilization.
Local rice has been planted in 1996/97 without fertilization.
FOR 1997 :
Rice will be planted in september 1997 : local rice + recommended Sembawa fertilisation (100 kg urea + 130 kg SP 36 + 75 kg KCL). Urea is provided in 3 periods : planting time, + 40 days and + 80 days after planting.
Chemical treatment againts pests and diseases.
Weeding : 2 weedings during growth.

DRY SEASON
According to farmers strategy: nothing or palawijas : such as groundnut wgich is the best inter crop for dry season.

ASSOCIATED TREES

Planting density : 92 trees/ha : 9 x 12 meters.

Selected trees are durian, Petai, Jengkol, Kemiri and Cinnamon + other trees acccording to local situation. The associated trees frame should be the same for all trials, or similar.
Weeding : same as for rubber (6 weedings/year).

FIELD SIZE per farm

PLOT SIZE : see field maps
NUMBER OF PLOTS PER REPLICATION : 3 plots for BLIG, seedlings and clone.
NUMBER OF REPLICATION/farm : 2

DATA TO BE COLLECTED

Standart data for all RAS 2.2 :
RUBBER
- rubber growth measurements : diameter, height and worls the first year every 3 months. Then girth the second year every 3 months. Sample of 30 trees per plot.
- Farmer's labour for each plot.
- soil samples per replication on 0-15 and 15-30 cm.

Total number of soil samples for the 2 farms : 3 plots x 2 rep x 2 soil depths = 12

ASSOCIATED TREES
- tree growth measurements : girth every year at planting anniversary time for all trees per plot.

RICE
- date of planting
- date of harvest
- yield of each plot with a sample of 100 grams to be sent to ICRAF/Bogor for water content measurement.

Labour requirement per plot.

ANEX 2

PLOTS SITUATION

Augustus 1996

RAS: 2.2a

emphasis : comparison 3 amounts of fertilzers for rubber

farmer : **WARNI**

field size : 5 500 m²

number of rep : 2

number of plot per rep : 3

Plot size 900 m²

total number of plots per field 6

TOTAL SIZE OF THE FIELD : 5400 m²

Slope : **MEDIUM**

Current status : entirely cropped, remaining rubber is well weeded

Rice : partly cropped in 95/96 with rice
Cropped in 1996 with local rice without fertilization
, planted the first week of july

Palawijas : cassava, groundnut in 1995/96

RUBBER :

clones : RRIC 100

date of planting January 1996

apparent number of dead trees : 30 % inmarch 96, 80 % in Augustus 96

Available stock of plants in polybag : sufficient

Replanting will occur in October 1996

Contour line : correct

ASSOCIATED TREES :

already planted on the field : few kemiri.

OBSERVATIONS :

The stacking of the plot has been done to identify the 6 plots (2 rep of 3 plots). Replanting will occur in October 1996. The fertilization of rubber will follow the protocol : 3 plots with A/0 fertilization, B/dose RP at planting time and C/ TSDP fertilization programme. We can consider that this trial, due to very high mortality, is initiated again in October 1996.

Augustus 1996

RAS: 2.2a

emphasis : comparison 3 amounts of fertilzers for rubber

farmer : **EMA** (daughter of Warni)

field size : 5 600 m²

number of rep : 2

number of plot per rep : 3

Plot size 900 m²

total number of plots per field 6

Slope : medium to high

Current status : entirely cropped, rubber is well weeded

Rice : partly cropped in 95/96

Palawijas : cassava, groundnut, chili

Cropped with local rice without fertilization in 1996/97 planted the first week of July.

RUBBER :

clones : PB 260

date of planting January 1996

Replanting : October 1996

apparent number of dead trees : 30 %in March 96, 80 % in Augustus 96.

Available stock of plants in polybag : sufficient

Contour line : not correct in the lower part. he upper part is not use for the rubber fertilization experiment. (see the field map)

ASSOCIATED TREES :

already planted on the field : few kemiri.

OBSERVATIONS :

The stacking of the 6 plots has been done.

Replanting will occur in October 1996. The fertilization of rubber will follow the protocol : 3 plots with A/0 fertilization, B/dose RP at planting time and C/ TSDP fertilization programme. We can consider that this trial, due to very high mortality, is initiated again in October 1996.

Same situation as EMA.

Augustus 1996

RAS:	2.2b
emphasis	Rice experimentation
farmer :	**SIAM**
field size :	5 500 m²
number of rep :	1
number of plot per rep :	4
Plot size :	1 300 m²
total number of plots per field	4

Slope : high

Current status : cropped with palawijas in dry season 96.
Cropped with local rice (Nias and Jarum peark) without fertilization in 1996 + palawijas (mais, sugar cane, chili, cassava and banana).: the rice experiment is cancelled in 1996

Rice : in rainy season 95/96.

Palawijas : groundnut, sweet potato and cassava in 95/986

v

RUBBER :

clones :	PB 260
date of planting	january 1996
Replanting :	Ocotber 1996
apparent number of dead trees :	25 % in March 96

Rubber growth : correct , average with 2 payung but growth is stopped by drought.

Available stock of plants in polybag : sufficient

Good level of weeding. ***Some cassava are still to be removed in the upper part of the plot (too much shadow).***

Contour line : correct

ASSOCIATED TREES :

already planted on the field : very few

OBSERVATIONS

The stacking of the plots has to be done according to field map. he plots will be used for the 1997 rice campaign.

Rice experiment is cancelled in 1996 due to planting of local rice by the farmer in July.

Augustus 1996

RAS:	**2.2b**
emphasis	Rice experimentation
farmer :	**BURHAM**
field size :	4 500 m²
number of rep :	1
number of plot per rep :	4
Plot size :	1 100 m²
total number of plots per field	4
Slope :	high but well protected by contour line
Current status :	cropped with local rice in 1996 (Nias) without fertilization
Rice :	local rice in rainy season 95/96.
Palawijas :	groundnut, cassava, chili, papaya in 96

RUBBER :

clones :	PB 260
date of planting	january 1996
Replanting :	October 96
apparent number of dead trees :	30 %.....

Available stock of plants in polybag : sufficient

Weeding should be done in certain place : too much shadow close to cassava for instance.

Contour line : correct

ASSOCIATED TREES :

already planted on the field : kemiri, durian

OBSERVATIONS

The stacking of the plots has to be done according to field map. he plots will be used for the 1997 rice campaign.

Rice experiment is cancelled in 1996 due to planting of local rice by the farmer in July.

Same situation as Pak Siam.

Augustus 1996

RAS:	2.2c
emphasis	Comparison between clone and BLIG
farmer :	**UDIN**
field size :	8 400 m²
number of rep for clone:	
number of plot per rep :	3
Plot size :	according to field map
number of rep for BLIG:	1
number of for seedlings SUMSEL :	1
Plot size :	
total number of plots per field	

Slope : medium to high

Current status : entirely invaded by alang² and weeds in March 1996. Entirely weeded and clan in Augustus 1996. Cropped with local rice (Nias) without fertilization.

Rice : not in rainy season 95/96 and no palawijas

Palawijas : no

RUBBER :

clones :	RRIC 100
date of planting	january 1996
Replanting	October 1996
Planting of seedlings SUMSEL :	October 1996
apparent number of dead trees :	more than 50 %.

Available stock of plants in polybag : sufficien

Contour line : seems to be correct

ASSOCIATED TREES :

already planted on the field : No

OBSERVATIONS

The stacking of the plot with 3 plots will be done according to field map.

Seedlings SUMSEL and replanting of dead rubber clones will occur in October 1996.

Augustus 1996

RAS: 2.2c
emphasis Comparison between clone and BLIG
farmer : **BUDIMAN**
field size : 6 400
number of plot per rep : 3
Plot size : according to field map
number of rep for clone 1
number of rep for BLIG: 1
number of rep for seedling SUMSEL : 1
Plot size :
total number of plots per field 3

Slope : medium to high
Current status : Cropped with local rice (Nias and Pudung Patir) without fertilzation.
Rice : in rainy 95/96 season
Palawijas : paddy, groundnut, cassava, chili in 96

RUBBER :
clones : PB 260
date of planting january 1996
Replanting October 1996
Planting of seedlings SUMSEL : October 1996
apparent number of dead trees : more than 50 %
Available stock of plants in polybag : sufficient
Good weeding
Contour line : correct

ASSOCIATED TREES :
already planted on the field : Kemiri

OBSERVATIONS

The stacking of the plot with 3 plots will be done according to field map.

Seedlings SUMSEL and replanting of dead rubber clones will occur in October 1996.

Same situation as Pak Udin.

Augustus 1996

RAS:	2.2b
emphasis	Rice experimentation
farmer :	**BADUL**
field size :	????? m²
number of rep :	1
number of plot per rep :	4
Plot size :	1 000 m²
total number of plots per field	4
Slope :	high
Current status :	belukar S & B in june/july 96
	Planting of improved rice in october 96 according to

RAS 2.2b protocol : 2 plots with Jatiluhur and 2 plots with Wayararem.

Rice :	not in 95/96.
Palawijas :	no

RUBBER :

clones :	PB 260
date of planting	October 96

Contour line : has to be done after weeding.

ASSOCIATED TREES :

already planted on the field :	no

OBSERVATIONS

Plots has to be implemented according to field map.

Augustus 1996

RAS:	2.2b
emphasis	Rice experimentation
farmer :	**MUKTAR**
field size :	???? m²
number of rep :	1
number of plot per rep :	4
Plot size :	1 000 m²
total number of plots per field	

Slope : MEDIUM

Current status : CROPPED partly with rice, partly weeded for being planted with Wayararem, according to field map.

Rice : CROPPED partly with rice, partly with alang² in 95/96 and in March 96

Palawijas : groundnut, cassava on 50 % of the plot

RUBBER :

clones : RRIC 100

date of planting October 96

Contour line : has to be done.

ASSOCIATED TREES :

already planted on the field : no

OBSERVATIONS

Plots has to be implemented according to field map.

ANEX 3

PADDY SURVEY

UPLAND RIVE VARIETY SURVEY
PADDI LADANG SURVEI

Desa :
Dusun :
Kecamatan :
Kabupaten :
Propinsi :

MARET 1996

NAMA JENIS PADDI LADANG	WAKTU PANEN BERAPA bulan	ORIGIN DARI MANA	OBSERVATIONS Observasi
1NIAS			
2 Jarum perak			
3 Pudung patir			
4.....			
5			
6			
7			
8			
9			
10			

Dari mana : asli, dari Jawa, dari lain, dari proyek (yang proyek....)
Semua informasi tentang produksi.....
Harus tulis yang jenis petani lebih suka.

ANEX 4

RUBBER GROWTH MONITORING

MEMO / RAS METHODOLOGY

RUBBER TREES GROWTH MONITORING IN RAS EXPERIMENTS

The first 6 month are very important in term of growth as rubber trees should develop correctly up to 5/6 whorls (normally 1 per month in good conditions). Then, the canopy and the girth begin to develop.
Therefore, the growth monitoring of rubber trees may be done as following :

- A - during the first year :

3 measurements :

- 1 - Diameter 10 cm above grafting point.

- 2 - number of whorls
control the distribution of trees with 1, then 2, 3, 4 and 5 (or more) whorls every 3 months in order to see the possible delay in growth compared to a standart growth (1 whirl per month in normal conditions).

-3 - The height of rubber trees should also be monitored, in particular in comparison with the average height of the forest regrowth in the interrow for RAS 1. Same frequency as for the number of whorls and diameter.

These 3 measurements may be done on the data file for RAS.

- B - at 12 months and every plantation birthday :
control of the circumference of rubber trees at 1 meter above ground level with a selected number of trees per plot. For tree sampling, refer to annex (from Rubber/CIRAD-CP) with 30 trees per plot to be monitored.

ANEX 5

INPUTS REQUIREMENTS
per farmer
per plot

WEST SUMATRA SRAP ON FARM EXPERIMENTATION PROGRAMME

Village of Bangkok

FARMER	type of RAS	RAS name	CLONE	Date of planting	ACTUAL TOTAL AREA real	Number of rubber trees	Number of rep /farm	Number Of plots	TREAMENTS
EMA	RAS 2.2a	Rubber fertilization	RRIC 100	Jan 96 oct 96	0.56	550 308	2	6	fertilization dose 0, RP planting only, TCSDP
WARNI	RAS 2.2a	Rubber fertilization	PB 260	Jan 96 oct 96	0.55	300	2	6	0, RP planting only, TCSDP
SIAM	RAS 2.2b	Rice experimentation	PB 260	Jan 96 oct 96	0.55	300	1	4	2 varietiesxdose(0, CRIFC) cancelled in 96
BURHAN	RAS 2.2b	Rice experimentation	PB 260	Jan 96 oct 96	0.45	248	1	4	2 varietiesxdose(0, CRIFC) cancelled in 96
UDIN	RAS 2.2c	Clone/BLIG comparison	RRIC 100 BLIG 1 seed/sumsel	Jan 96 March 96 oct 96	0.42 0.21 0.21	231 116 116	1 1 1	3	clonexBLIGxseedlings
BUDIMAN	RAS 2.2c	Clone/BLIG comparison	PB 260 BLIG 1 seed/sumsel	Jan 96 March 96 oct 96	0.32 0.16 0.16	176 88 88	1 1 1	3	clonexBLIGxseedlings
BADUL	RAS 2.2b	Rice experimentation	PB 260	oct 96	0.8	440	2	8	2 varietiesxdose(0, CRIFC)
MUKTAR	RAS 2.2b	Rice experimentation	RRIC 100	oct 96	0.8	440	2	8	2 varietiesxdose(0, CRIFC)
BURHAM	*extra plot*	*Rice experimentation*							

FERTILIZERS REQUIREMENT FOR 1996

FARMER		RUBBER REQUIREMENT FOR 1996 SETIAP TIGA BULAN				RICE BPS			PLOT	RICE CRIFC			RICE SEEDS	
		PLANTING	LATER			100	140	75		150	225	150		
		RP	SP36	UREA	KCL	SP36	UREA	KCL		SP36	UREA	KCL	jatiluhur	wayararem
		200	40	50	40	PER FIELD				PER PLOT OF 1000m²				
		grams/tree	to be supplied in dec for January 97							for october planting				
	PLOT	in kg/field												
EMA	A	0	0	0	0	NO RICE FERTILIZATION IN 1996								
	B	1,000												
	C	62	12	15	12									
WARNI	A	0	0	0	0	NO RICE FERTILIZATION IN 1996								
	B	1000	0	0	0									
	C	60	12	15	12									
SIAM		60	12	15	12					NO FERTILIZATION ON 1996				
BURHAN		50	10	12	10					NO FERTILIZATION ON 1996				
UDIN		46	9	12	9	NO RICE FERTILIZATION IN 1996 except new plot planted with seedlings/sumdel							10	
BUDIMAN		35	7	9	7	NO RICE FERTILIZATION IN 1996 except new plot planted with seedlings/sumdel							10	
BADUL		88	18	22	18				A/0	0	0	0	5	
									B/CRIFC	15	23	15	5	
									C/0	0	0	0		5
									D/CRIFC	15	23	15		5
MUKTAR		88	18	22	18				A/0	0	0	0	LOCAL	
									B/CRIFC	15	23	15	LOCAL	
									C/0	0	0	0		5
									D/CRIFC	15	23	15		5
									A/0	0	0	0		5
									B/CRIFC	15	23	15		5
TOTAL		2,488	98	122	98	0	0	0		75	113	75	30	30

	TOTAL REQUIREMENT FOR RUBBER			
	RP	SP36	UREA	KCL
Total kg	2488.4	98	122	98
	Oct 96	to be supplied in january 1997		

	TOTAL REQUIREMENT FOR RICE			
	RP	SP36	UREA	KCL
Total kg		75	113	75
	to be supplied in SEPT 96			

TOTAL REQUIREMENT FOR RICE and RUBBER				
	RP	SP36	UREA	KCL
Total kg	**2,488**	**173**	**235**	**173**

TO BE ORDERED for september 1996				
	RP	SP36	UREA	KCL
	2500	200	250	200
Price in rp	200	500	500	500
TOTAL COST	500,000	100,000	125,000	100,000
total fertilizer cost		**825,000**		

ANEX 6

SRAP BUDGET IN WEST SUMATRA

TOTAL GAPKINDO+PRO-RLK

1996

OPERATING COST OF SRAP IN AUGUSTUS 1996

In roupiah

INPUT	quantity	Price /kg or l	TOTAL COST	GAPKINDO USAID	PRO RLK
COST OF TRIALS ESTABLISHMENT/West Sumatra					
Round-up	10	25000	150,000		
rice seeds			ICRAF		
fertilizers for rice AND RUBBER			825,000		
Furadan			200,000		
pesticides/Insecticides for rice			200,000		
Plants of sao : 10 /farmers	80	5000	400,000		
Sprayer for rice			150,000		
Traps for pigs	120	3500	420,000		
Tools			100,000		
polybag for associated trees			100,000		
COST FOR Rao's nursery			300,000		
Other inputs/miscellanous			600,000		
TOTAL COST FOR INPUTS			**3,445,000**		
COST FOR SIGNS			**500,000**		
TOTAL COST			**3,945,000**	**2,945,000**	**1,000,000**
farmers's training/PPL bangkok					**1,000,000**

A total amount of 3 000 000 rp will betransfered on Pro-RLK account for SRAP activities
Note : the balance of 1 000 000 rp from Pro-RLK is approximative.
The original amount is 2 millions minus previous expenses

ANEX 7

WEEDING AND FERTILIZATION PROGRAMME

PROPINSI SUMATERA BARAT

PROGRAM MENBERSIHKAN LAPANGAN PERCOBAAN PETANI

ALL RAS 2.2 BANGKOK

BAGIAN 2 : 6 MENBERSIHKAN per tahun untuk pohon karet dan pohon lain
membersihkan di barisan karet saja
Di lorung ada tupangsari

Waktu tanaman	Mulai	+ 2 bulan	+ 4 bulan	+ 6 bulan	+ 8 bulan	+ 10 bulan
December 95	Mulai March	Mulai may	Mulai July	Mulai September	Mulai November	Mulai January

PROGRAM PEMUPUKAN LAPANGAN PETANI RAS

PUPUK PER POHON KARET

IN GRAMMES/tree

	WAKTU T-ANAMAN October 96	+ 3 bulan JANUARY 97	+ 6 bulan APRIL 97	+ 9 bulan JULY 97	+ 12 bulan OCTOBER 97
RP	200				
UREA		50	50	50	50
SP36		40	40	40	40
KCL			40	40	40